

REMARKS

Claims 1-7 are all the claims pending in the application.

I. RESPONSE TO REJECTION UNDER 35 U.S.C. § 102

Referring to pages 2 and 3 of the Office Action, claims 1-4 and 6 are rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Cooprider (U.S. Patent No. 5,571,617).

Applicants respectfully traverse. The rejection should be withdrawn because Cooprider does not disclose or suggest the pressure-sensitive adhesive (“PSA”) tape or sheet recited in the present claims.

Claim 1 is the only pending independent claim. It recites that, in a surface portion of the PSA layer within the range of up to 3 nm inward from the outer face of the PSA layer, there is an anionic emulsifier (B) in a proportion of from 0.1 to 3 parts by weight based on 100 parts by weight of the whole of the monomer components constituting the acrylic polymer (A) that forms the surface portion of the PSA layer. Cooprider does not disclose or suggest this feature of Claim 1.

For example, at column 6, lines 21-33, Cooprider discloses that “surfactants will be present in the reaction mixture in an amount by weight of no greater than 5 parts by weight per 100 parts by weight of polymerizable monomer.” Thus, Cooprider teaches that the amount of 5 parts by weight or less with respect to 100 parts by weight of the polymerizable monomer is the amount of emulsifier to be used for polymerization.

In contrast, Claim 1 recites that the emulsifier amount of 0.1 to 3 parts by weight is the amount detected in the surface portion within the range of up to 3 nm inward from the outer face

of the tape or sheet of the PSA. Therefore, Coopriders disclosure of “no greater than 5 parts by weight” says nothing about the presently claimed range of “0.1 to 3 parts by weight.”

The examiner acknowledges at page 2 of the Office Action that Coopriders “does not specifically disclose the amount of the anionic emulsifier containing a sulfur atom in the surface portion of the psa layer within the range of up to 3 nm inward from the outer face of the psa layer.” The examiner, however, reaches the following conclusion:

[T]he aqueous dispersion type psa composition formed by the reference has very little coagulum (see Col. 9, line 46). In other words, it is the finely dispersed psa composition that is obtained. Since each component in the composition including the anionic emulsifier containing a sulfur atom is dispersed finely, the amount of each component in the resultant psa layer should be uniform, and the psa sheet formed by the reference should comprise the same ratio of the anionic emulsifier containing a sulfur atom in the surface portion of the psa layer.

Applicants respectfully disagree.

In general, when an aqueous dispersion type PSA composition is coated and dried on a substrate, the emulsifier will not be uniformly dispersed throughout the PSA. Instead, because the emulsifier is a low molecular weight component, it tends to be distributed on the outer face of the PSA.

In the presently claimed PSA tape or sheet, in order to enhance the dispersing stability of the aqueous dispersion type PSA composition, as well as to improve the polymerizing stability and mechanical stability of the aqueous dispersion type PSA composition, the emulsifier is added

in the given content to the whole PSA layer. See the paragraph bridging pages 8 and 9 of the present specification.

However, when no hydrophilic polymer is added, the PSA layer to which the emulsifier is added experiences deteriorated adhesion to wet surfaces. See the paragraph bridging pages 9 and 10 of the present specification; and Comparative Example 1. This deterioration in adhesion is considered to be attributable to the fact that water is stabilized on the outer face of the PSA layer due to the distribution of the emulsifier on the outer face of the PSA layer. The emulsifier, which is a relatively low molecular weight material, migrates inside the PSA layer during the PSA layer coating and drying processes to be in an energetically stable state with its hydrophobic groups being orientated to the surface contacting the air, which is the hydrophobic surface.

Incidentally, it is apparent from Comparative Example 1 of the present specification that the emulsifier is distributed in a large amount on the PSA layer outer face in the case where the hydrophilic polymer is not added. If the emulsifier was actually uniformly dispersed in the PSA layer of the composition of Comparative Example 1, a theoretical sulfur element ratio would be 0.19 atomic% (the content ratios and the atomic numbers of the elements in the PSA layer are as shown in Tables A and B of the Appendix attached to this Response). However, since the actual measurement value of the sulfur element ratio in the surface portion of Comparative Example 1 is 1.1 atomic% (see Table 1 of the present specification at page 49), it is apparent that the emulsifier is distributed in the surface portion in an amount much greater (about 5.8 times greater) than the element content that would be found if there was an actual uniform dispersion.

In the case where the emulsifier is present in a large amount on the outer face of the PSA layer, the emulsifier stabilizes water by the effect of the hydrophilic group thereof (the emulsifier is turned around so as to orient its hydrophilic group toward water) when moisture such as dew or condensation is present on the outer face (or on the boundary with an adherend). As a result, a stable water layer is formed on the outer face of the PSA layer, so that the adhesion in the wet state is deteriorated. See Fig. 1 attached to this Response.

In contrast, the claimed PSA tape or sheet solves this problem by the addition of a specific amount of a specific hydrophilic polymer (component (C)), *i.e.*, the improvement in adhesion to wet or dew surfaces is achieved when the given amount of the emulsifier is added. See the paragraph bridging pages 9 and 10 of the present specification. Applicants consider that this improvement in adhesion is realized because the hydrophilic polymer present at the inner part of the PSA layer prevents the distribution of the emulsifier towards the outer face and thereby reduces the amount of the emulsifier in the outer face.

A hydrophilic polymer, such as polyethylene glycol ("PEG"), will not be present in the surface portion of the PSA layer, but will actually be present in the portion of the PSA layer remote and relatively inward from the air contact surface, which is the hydrophobic surface. Fig. 2 attached to this Response is an electron microscope picture showing a dispersion state of the hydrophilic polymer (PEG) in the PSA. The line on the upper right is the outer face of the PSA layer, and the portion under the outer face is the PSA layer. In the PSA layer, the dark portion is the PEG portion, and it is apparent that PEG is present in the inner portion which is relatively remote from the outer face.

As explained above, the presence of the hydrophilic polymer in the PSA layer causes the PSA layer inner portion to be more hydrophilic than the surface portion, so that the moisture adhered to the outer face may be easily drawn to the inner part of the PSA layer.

In addition, the hydrophilic polymer influences the distribution behavior of the emulsifier. That is, the hydrophilic polymer interacts with the hydrophilic portion of the emulsifier to draw the emulsifier to the inner portion of the PSA, thereby reducing the amount of the emulsifier present in the outer face of the PSA. See Fig. 3 attached to this Response. Due to this effect, a concentration gradient of the emulsifier (B) is caused, thereby making it possible to control the emulsifier concentration in the outer face part and the inner part of the PSA. See the present specification from the paragraph bridging pages 14 and 15 to page 16, line 5. Moreover, this effect is prominently exhibited when the PSA layer has a multilayer structure.

Thus, since moisture, such as dew condensation water, is prevented from being stabilized on the PSA layer outer face, the moisture is easily drawn toward the inside of the PSA layer. Particularly, when the emulsifier concentration on the outer face is lower than that of the inner layer, the moisture tends to be stabilized in the inner layer, thereby making it even easier for the moisture to be drawn into the inner part of the PSA layer.

The emulsifier (component (B)) also has the role of uniformly dispersing the hydrophilic polymer (component (C)) having the high polarity into the acrylic polymer (A). As explained above, the effect of the claimed PSA tape or sheet is achieved because the interaction between the specific emulsifier (B) and the hydrophilic polymer (C) is caused when they are mixed in the specific ratio.

In Example 1 of Cooprider, it is described that the emulsifier is mixed in the concentration of about 1.2 parts by weight with respect to 100 parts by weight of the acrylate monomer. If the segregation of Cooprider's emulsifier towards the outer face of the PSA is also 5.8 times the result of actual uniform dispersion, as described above, a proportion of about 7.0 parts by weight will be segregated on the outer face, so that the proportion would be well out of the presently claimed range (0.1 to 3 parts by weight).

The examiner may wonder whether, in Example 1 of Cooprider, a segregation reduction effect (i.e., an emulsifier concentration gradient) similar to that of the presently claimed PSA can be achieved, because a hydrophilic polymer is added in Cooprider's Example 1. Applicants submit that a segregation reduction effect (i.e., an emulsifier concentration gradient) similar to that of the presently claimed PSA is not achieved by Cooprider. The reason why this is so is most clearly seen by examining the method of adding the hydrophilic polymer in Cooprider.

Cooprider teaches a PSA layer wherein the hydrophilic polymer is added as the polymerization stabilizer before the polymerization. However, in order for the polymerization of the acrylic polymer (A) to not be adversely affected, the hydrophilic polymer (C) is preferably added to the aqueous dispersion type PSA composition after the polymerization of the acrylic polymer (A). See the present specification at the paragraph bridging pages 29 to 30.

Further, Cooprider discloses that the hydrophilic polymer adheres to the particle surface when added before the polymerization. However, in the present PSA tapes or sheets, as can be confirmed from the electron microscope picture shown in Fig. 2 attached to this Response, since the hydrophilic polymer is added after the polymerization, the hydrophilic polymer is dispersed

in a lump state (*i.e.*, in a state not adhering to the particle surface) in the PSA after the PSA composition is applied and dried. Significantly, the dispersed lump state causes excellent initial adhesion to the dewing surface or wet surface, which is the effect of the present tapes or sheets. From this viewpoint, the present tapes or sheets and Cooprider are totally different from each other, and one of the primary distinguishing characteristics of the presently claimed PSA over Cooprider is realized.

Further, the aimed effect of the present tapes or sheets is excellent initial adhesion to a dewing surface or wet surface and excellent peeling-preventing properties, while the effect of Cooprider is excellent reapplication. Thus, the effects of the present tapes or sheets and Cooprider are also quite different.

In view of the above, withdrawal of the present § 102 rejection is requested.

II. RESPONSE TO REJECTION UNDER 35 U.S.C. § 103

Referring to pages 3 and 4 of the Office Action, claims 5 and 7 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable by Cooprider.

Applicants respectfully traverse the rejection. Cooprider does not disclose or suggest the PSA tapes or sheets of claims 5 and 7.

Here, claim 5 depends from claim 1 and further specifies that the PSA layer on one side of the substrate has a *multilayered* structure. Claim 5 also recites that an outermost layer of the multilayered PSA layer has a thickness of from 1 to 5 μm and contains the anionic emulsifier (B) in a proportion of from 0.1 to 3 parts by weight based on 100 parts by weight of the whole of the monomer components constituting the acrylic polymer (A).

In contrast, as acknowledged by the examiner, Cooprider “fails to disclose that the PSA layer on one side of the substrate has a multilayered substrate.” See page 3 of the Action. Consequently, Cooprider fails to teach one having ordinary skill in the art a PSA having a multilayered structure.

Any difference in structure must be taught or suggested by the reference, or it must be shown how two references may be combined. The present Office Action, however, does not identify where Cooprider suggests or motivates one having skill in the art to use a PSA with a multilayered structure. The Office Action also fails to identify a second reference to make up for the deficiencies of Cooprider.

Accordingly, a *prima facie* case of obviousness has not been established with respect to claim 5.

With regard to claim 7, which also depends from claim 1, the Office Action does not present a basis in fact, technical reasoning, and/or other evidence establishing that a porous substrate would be obvious. Cooprider is silent with respect to using a porous substrate. Therefore, the examiner has not shows how Cooprider teaches, suggests or motivates one having skill in the art to use a porous substrate.

Accordingly, Applicants submit that a *prima facie* case of obviousness with regard to claim 7 has not been established.

In view of the above, reconsideration and withdrawal of the section 103(a) rejection of claims 5 and 7 based on Cooprider are respectfully requested.

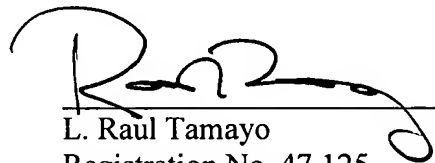
Response Under 37 C.F.R. § 1.111
U.S. App. No.: 10/701,496

III. CONCLUSION

Allowance is respectfully requested. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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Date: November 14, 2006